



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES



In re patent application of:) Art Unit: 1746
K. Covert et al.) Examiner: Alexander Markoff
Serial No.: 09/274,935) Date: April 29, 2003
Filed: March 23, 1999) Atty. Docket No.: EN997064
For: COPPER CLEANING)
COMPOSITIONS, PROCESSES AND)
PRODUCTS DERIVED THEREFROM)

APPEAL BRIEF

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Honorable Commissioner of Patents and Trademarks
Washington, DC 20231

S I R:

This Appeal is taken from the FINAL REJECTION of claims 1
through 20 as presented in the Office Action of December 4,
2001 (Paper No. 10), in the above-identified application.

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REAL PARTY IN INTEREST

The real party in interest hereto is Appellants'
assignee. The interest in the invention was assigned by the

inventors to International Business Machines Corporation at the time of filing the application, and was recorded on Reel No. 010023, Frame No. 0741.

RELATED APPEALS AND INTERFERENCES

This appeal is the first appeal before the Office.

STATUS OF THE CLAIMS

All of the presently pending claims 1 through 20 now stand FINALLY REJECTED as of December 4, 2001 (Paper No. 10), which was reaffirmed in the Advisory Actions of March 29, 2002 (Paper No. 12), April 19, 2002 (Paper No. 15), and May 24, 2002 (Paper No. 18).

The rejection of claims 1 through 20 is hereby appealed.

STATUS OF THE AMENDMENTS

The subject patent application was filed on March 23, 1999. An Office Action rejecting claims 1 through 20 was mailed on December 21, 2000 (Paper No. 5). An Amendment and Affidavit were filed on April 4, 2002. An Office Action

again rejecting claims 1 through 20 was mailed on June 19, 2001. An Amendment was submitted on May 10, 2001. An Office Action finally rejecting claims 1 - 20 was mailed on December 4, 2001 (Paper No. 10). A Response after Final Office Action was filed on March 14, 2002. A first Advisory Action maintaining the rejection of the claims was mailed on March 29, 2002 (Paper No. 12). A Response to the first Advisory Action was filed on April 11, 2002. A second Advisory Action maintaining rejection of the claims was mailed on April 19, 2002 (Paper No. 15). A Response to the second Advisory Action was filed on May 9, 2002. A third Advisory Action, maintaining rejection of the claims was mailed on May 24, 2002 (Paper No. 18). Applicants filed a Notice of Appeal on July 2, 2002.

SUMMARY OF THE INVENTION

The invention comprises microetching techniques for removing a small layer of copper from copper features forming part of a printed circuit board (page 2, paragraphs 1 and 2; and page 12, lines 1-4 of the specification). The etchants used are many which have been used before (page 5, lines 15 - 19), but the microetching techniques manage their use so that large quantities of copper are not removed (page 11, lines 3 - 12). The copper is selectively removed (page 12, lines 18 - 23) in the present invention by applying an

inorganic acid echant, persulfate and phosphate salts (page 11, lines 12 - 18). Microetching techniques are of recent vintage, and it is believed they would not have been commonly used for fine line circuitry, which came into vogue in the mid 1990s (page 8, paragraph 2).

ISSUES

Issue No. 1: Whether claims 1, 2, 5, 6, 8, 9 and 13 are anticipated by Japanese Reference No. JP 5-148,658 under 35 U.S.C. §102(b).

Issue No. 2: Whether claims 14 through 20 are unpatentable over Japanese Reference No. JP 5-148,658 under 35 U.S.C. §103(a).

Issue No. 3: Whether claims 3, 4, and 7 are unpatentable over the Japanese Reference No. JP 5-148,658, in view of U.S. Patent No. 4,238,279 (TSUBAI et al.), under 35 U.S.C. §103(a).

Issue No. 4: Whether claims 10 through 12 are unpatentable over Japanese Reference No. JP 5-148,658 in view of U.S. Patent No. 5,855,805 (ARABINICK), under 35 U.S.C. §103(a).

GROUPING OF THE CLAIMS

The claims cannot be grouped together, taking into account that claims 1 through 16 recite a microetching process for cleaning copper surfaces without removing bulk copper, and claims 17 through 20 recite methods of manufacturing intermediate circuit board structures.

ARGUMENT

The Honorable Board is respectfully requested to reverse the rejection of claims 1 through 20.

Included with the first legal issue regarding claims 1, 2, 5, 6, 8, 9, and 13, which were rejected under 35 U.S.C. §102 over Japanese Reference No. JP 5-148,658, is the sub-issue of whether the reference was applicable to microcircuitry. A second sub-issue is whether the particulars of the claims, such as substrate materials and method steps, have been described by the reference. A third sub-issue is whether the diametrically opposite purpose of the reference should qualify the reference as a valid teaching in the sense of 35 U.S.C. §§102 and 103. A fourth sub-issue is whether the teaching of nitric acid use in the reference is opposite the teachings of the invention that eschews its use.

To the best of the undersigned Attorney's knowledge and belief at the time of filing the above-identified application, microetching as a process for fine line circuitry was first coming into use in the industry.

The filing date of the main reference, JP 5-148,658, circa 1993, casts doubt on whether it would be relevant to the techniques being taught in the subject specification. In corroboration of this assumption is the admission by the Office in the FINAL REJECTION (Office Action mailed December 4, 2001, page 3, line 7), wherein the cited Japanese reference **"does not specify the specific substrates and conventional steps of the process of manufacturing of integrated circuits recited by the claims."**

In the description of this invention, Appellants state that, despite using some of the old substances for etching, the details of the technique prevent the bulk removal of copper common to non-microetching techniques. Therefore, with all due respect to the personnel of the USPTO, it is clear that the reference was probably not practicing or anticipating microetching. This is particularly true by contrasting the great number of method steps and detail in Appellants' specification with that of the subject reference. Can claims 17 through 20 be rejected over JP 5-148,658 alone, on the basis of what is admitted to be a lack of detail of structure?

Included with the aforementioned legal issues is the fifth sub-issue: whether TSUBAI teaches or suggests the techniques presented in Appellants' specification.

Also included with the legal issues is the sixth sub-issue: whether the ARABINICK reference provides a teaching of the surfactants used by Appellants sufficient to make the combination rejection valid.

The much earlier reference to TSUBAI et al., circa 1980, used in combination to reject claims 3, 4, and 7, does not appear to comprise the microetching techniques called for by Appellants. Therefore, either alone or in combination, the purpose of the invention is not shown by the cited references.

It is of significance that the purpose of the Japanese reference is almost diametrically opposite to that of Appellants' invention. Bulk copper removal is not the problem for this Japanese reference. The Japanese reference has a whisker forming problem, not a bulk copper removal problem. Appellants, on the other hand, are using much finer copper wire thicknesses. The Japanese reference is being read into Appellants' invention. Where the reference coincides with similar chemistry, it fails by being an opposite teaching (i.e., the problem of growth of the copper whiskers versus Appellants' problem of bulk copper removal).

It appears that the Office has not addressed the above arguments with enough specificity throughout the prosecution. Rather, the prosecution seems to have focused on the fact of whether Appellants are teaching the use of nitric acid. Pages 3 and 4 of the specification state that the use of nitric acid is too environmentally dangerous, and therefore should not be used in microetching; there is a problem of toxic byproducts. The Japanese reference uses nitric acid, as does TSUBAI et al.

On page 13, lines 9 through 11, Appellants speak of nitric acid. The Office interprets this as contrary to Appellants' purposes. But, this statement is an obvious drafting error because all through the specification, Appellants specifically refrain from its use. Even claim 5, which lists acid substances, does not recite nitric acid. Had Appellants wanted or intended to use nitric acid, they would have included it in claim 5. More importantly, however, Appellants believe that the statement on page 13, lines 9 through 11, does not actually suggest the intended use of nitric acid. It is immediately thereafter stated that nitric acid was "not preferred due to toxic byproducts such as nitrogen oxides." This is precisely in keeping with the statements on page 3 of the specification, and additionally as one of the advantages in paragraph (f) of the Summary of the Invention, page 9 of the specification: "a stable,

environmentally acceptable, and non-hazardous microetchant formulation."


The Office has inferred from that one sentence that the references that use nitric acid, JP 5-148,658 and TSUBAI et al., are sufficient teachings of Appellants' invention. It is respectfully believed that this is a great leap of logic, particularly in view of the aforementioned Office admission that the Japanese reference does not teach the method steps or structure of microelectronics.

The one cited reference that actually refers to microetchants is ARABINICK. The combination of ARABINICK with JP 5-148,658 to reject claims 10 through 12 does not teach the claimed invention because ARABINICK does not teach the combination of etchant substances recited in claims 10 through 12. The Office admits in the Final Rejection (page 5, line 9) that the reference does not recite the specific surfactant claimed. The difference is not made up by the Japanese reference. The Office states, "the use of the surfactants disclosed by ARABINICK in the method of JP 5-148,658 for their primary purpose with reasonable expectation of adequate results because ARABINICK teaches that the use of these surfactants improves the process." This does not make sense in view of the Office's prior admission that ARABINICK does not teach the surfactants of Appellants. In addition,

the Office previously admitted that JP 5-148,658 did not teach the details of the invention.

Appellants respectfully believe that the rejections do not make sense, and that the cited references teach away from the invention rather than anticipate or render obvious the invention. More importantly, none of them, with the exception of ARABINICK, is particularly relevant.

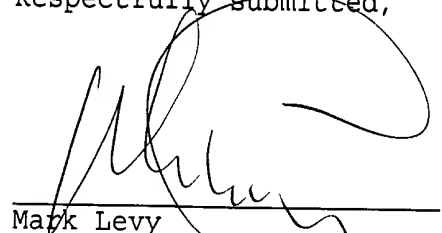
Claims 14 through 20 were finally rejected over Japanese Reference No. JP 5-148,658 as unpatentable under 35 U.S.C. §103(a). Appellants respectfully believe that the process steps described in claims 1 through 13 involve the general cleaning of copper surfaces, whereas the process steps of claims 14 through 16 are specifically directed to precious metal and nickel surfaces, thus constituting a different inventive problem of galvanic or accelerated etching not addressed by the reference. Claims 17 through 20 recite a process for manufacturing an intermediate structure having an embedded resistor in the printed wiring board, and such a process is once again not mentioned by the reference. These claims have been lumped together in forming the rejection of 35 U.S.C. §103, but require separate consideration.



CONCLUSION

The Honorable Board is respectfully requested to reverse the rejection of claims 1 through 20, and allow the subject application to issue as a patent.

Respectfully submitted,



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